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ABSTRACT

Developmental education activities should attempt to provide experiences which do not hold the student back from the normal flow of learning and which utilize processes already in the student's repertoire. Virtually all areas of developmental instruction can be supplemented with games and simulations, that is, activities designed to show the process of a possible or actual reality in which roles, resources, rules, and goals are specified. Games and simulations are discrete, complete, and logical. They are approximations, just as laboratory situations or apprenticeships approximate real work situations. In designing or using games, one should (1) determine what the student is to learn; (2) determine what proto-processes or pre-concepts are necessary to do the behavior; (3) design the general structure of the game by specifying roles, goals, resources, interactions, sequence of events, and external factors; (4) write out the game as a process; (5) design the materials; (6) write the rules; (7) evaluate and revise the game; and (8) pre-test and evaluate the game again. There must be a point to playing the game and that point must be made clear to the student. Behavioral objectives must be clearly spelled out and measured accurately. Whether used in the classroom or in a supplementary learning environment, games and simulations can help the learner gain the advantages of skill facility in the application of a particular discipline's terms and concepts. (Author/MB)

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GAMES AND SIMULATIONS IN DEVELOPMENTAL EDUCATION

A WORKING PAPER FOR PRESENTATION

FIFTH ANNUAL OHIO DEVELOPMENTAL EDUCATION CONFERENCE
OCTOBER 14 and 15, 1977

JC 790 107

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ABSTRACT

GAMES AND SIMULATIONS IN DEVELOPMENTAL EDUCATION

Problems of developmental education include providing experiences for the student without holding him/her back from the normal flow of his/her learning career and utilizing processes of learning already in his/her repertoire. Virtually all areas of developmental instruction can be supplemented with games and simulations. Games and simulations are approximations, just as laboratory situations or apprenticeships approximate the real work situations.

There must be a point to playing the game or simulation and that point must be made clear to the student. Behavioral objectives must be clearly spelled out and measured accurately. Whether used in the classroom or in a supplementary learning environment, games and simulations can help the learner gain the advantages of skill facility in the application of terms and concepts in particular disciplines and in a multidisciplinary core.

NOTE: This paper is meant as a working document for discussion, not a definitive statement.

INTRODUCTION

It appears that games/simulations are ubiquitous if not universal.* Ethnographic work first in anthropology and lately in both sociology and psychology has pointed to the pervasiveness of games/simulations, not just in socialization of youngsters in rites of passage, but in religious practice, mate selection and economic behavior. The anthropologists divide games into three categories: physical, strategy and chance. They hypothesize modal personality characteristics on the basis of the types and proportion of games found in different societies.

As Jacob Bronowski has pointed out, the playing of games is not only an insight into basic phenomena and processes, but may even offer clues to the inner or hidden structure as in the case of John Dalton's extrapolation from the games of bowls to a concept of atomic theory (weights of elements). The work of Mendeleev even earlier toward a periodical table of chemical elements was done by a shuffling and arranging of cards that his friends called the game of Patience.[1]

It may even be hypothesized that much art and music (even in commercialized societies) are simulations. The music of Donna Summers, Elvis Presley and the blues of Ethel Waters are clear examples. The impact of games/simulations can be seen not only in the Roman Catholic communion, but also in a society that has

*Games/Simulations will be used to refer to any of this kind unless game or simulation is being discussed separately.

Big Wheels, Barbie Dolls and the $64,000 Question.

Games/simulations are all around us. If the sales are any indication, games and simulations constitute a large part of our lives. This year's Sears Christmas catalog has 25 pages of games it classifies as adult games, and 60 pages of games for children (there is some overlap), including a computer that plays chess with you. "At a later date, game can be upgraded with a more difficult program...."[2] From Aggravation through the Xavier Hollander Game to Anti-Monopology and Lie, Cheat and Steal games cover all facets of life. Eric Berne and Thomas Harris have spearheaded the study of "serious games" in psychology and human development. Erving Goffman in The Presentation of Self in Everyday Life almost twenty years ago defined social interaction as games.[3] Even Shakespeare acknowledged in Hamlet and elsewhere both games and simulations.[4]

Students of popular culture might even contend that interest in and observation of violent contact sports is a simulation for individuals who cannot adjust to not having a war to watch.[5]

In the case of the Buz Kashi, a game of polo/capture the flag using the headless body of a calf, played by Afghanistanian horsemen, we see the conflict between the nomadic and sedentary ways of life. We can also witness a simulation of the individualism necessary for survival at that particular point in time.[6] Both participatory and vicarious violence may be motivated not from situational factors, but may be a part of our sociobiology.[7]

More to the point though, man learns many of his skills by engaging in a process known as trial and error. Successive approximation is the usual form trial and error can take when there if feedback whether the skill be a operation/process, a task to be completed, something to be mastered, or an opponent over whom one wishes to be victorious.

Many of us who taught in the primary and intermediate grades used games and we even made up simulations because we knew our students' attention span was limited and variations in the drills we gave we knew were better than doing the same thing over and over again. Spelling baseball and play store are only two of the simplest. Graphs, illustrations, charts, tables, figures are all simulations. Even some verbal descriptions such as "every third child born is Chinese," "25% of the population moves every year," or "every marriage has only a fifty percent chance of lasting" may qualify as simulations. The ridiculousness of this last simulation seems obvious, but when stated, "for every two marriages this year, there will be one divorce,"we all sit up, shake our heads and talk about the decline of the family as an institution."

Many word problems are simulations, case books for law, accounting, management and even home economics. In-basket exercises are often simulations, sometimes in game form. Textbooks, student guides and supplementary materials including training for advanced degrees in education now include games/simulations. Sensitivity, interview, medical, forensic and other types of training involve quite a significant amount of simulating.

THEORETICAL PERSPECTIVES

A few general definitions might now be in order. A game may be any activity with rules and goals. There is conveyed with the word game an idea of linearity, with objectives and a process for achieving those objects. There is also understood the idea of an opponent, animate or inanimate, and the attempt at winning, mastery, besting, or at the very least, contesting.

A simulation is a dynamic working model of an object or situation. Note, the object or situation does not have to exist or ever have existed. The Club of Rome has been simulating Armageddon for several years now. Many of us are acquainted with simulators; we may even have had part of our military or driver's education training in that mode.

> A game/simulation can be an activity designed to show the process of a possible or actual reality in which roles, resources, rules and goals are specified.

Games and simulations or the combination of the two are discrete, complete and logical, three of the major elements crucial for learning. They put learning in a framework that is evident and at least partially concrete, even though the reality is a simulation, an abstraction itself and probably an over-generalized one at that.

The definitions used are simply directional. There are many

overlaps, producers' biases aside. A game or simulation may be combined with other activities and elements of games and simulations can be integrated into a discussion or demonstration without the criteria of definition being obtained--the point is that whatever we do is successful as a teaching/learning tool.

The rationale for games/simulations comes from three major sources; A sociological theory of action, a Deweyian pragmatism, and cybernetic principles of learning. Without boring you with a repetition of graduate courses, several important elements need to be recalled.

Let's take sociological theory first. The behavior that man engages in can be roughly divided into two types: Goal-oriented and non-goal oriented. Non-goal oriented is the intransiveness of a verb. Goal-oriented behavior is by its very nature social in nature and therefore involves an object. Following, for the goal-oriented behavior to be more than simply an unconditioned response to a given stimulus, there needs to be alternative means of achieving that goal. Let us put aside there the question of whether the object of instruction is to obtain a conditioned/automatic response to a given stimulus (as in the case of fill-in-the-blank examinations).

Learning, then, is a behavioral change bringing about a more efficient and effective means of achieving a goal. Note the need for pre-testing, a student who already "knows" all the "best" answers is not going to profit a great deal from a "learning

experience."

Second, doing the goal-oriented behavior, until we can find a "smart pill" appears the best way of learning, unless it is dangerous, cost prohibitive, or external (legal, etc.) factors prohibit it. Simply stated, the only way a person can learn to write is to write. Even so called ephemeral behaviors such as visualization require some demonstration of successful completion, since we can't get into the student's head. A student, therefore, who says "I know what I want to say; I just can't say it" really doesn't "know" what he wants to say--he doesn't have the behavior in his repertoire. Evaluation of affect here is at best questionable and most probably fraudulent.

Finally, preparing a person with mechanisms for determining how efficiently and effectively he reaches his goals and providing him with sign posts along the way provides him with the stimuli to add correct behaviors to his repertoire or correct and try a different behavior to obtain the goal. (One of the problems of classical psychoanalysis is that there is no provision for this type of activity to take place). We have for at least the last few years called this process feedback.

A feedback loop, the primary element in cybernetics, means that within the behavior itself is the mechanism for correcting incorrect behavior and rewarding correct behavior in order to stimulate the repetition of it and the internalization of it into the individual's behavioral repertoire. Thus, in teaching,

the object of instruction is to "perturb the feedback properties of response systematically in order to provide the learner with opportunities to extend his understanding and control of his own actions in relation to the environment."[8]

The theories and practices of developmental education are multiple and for the most part are based on sound principles and research. It is not my purpose here to evaluate or even discuss them. It is my purpose though to present a technique of developmental education which may be found to significantly alter the way we look at developmental education. The technique can be used with students in special developmental classes, in developmental support systems, in classrooms where there is a developmental component and in classrooms where there is no special developmental component but where the developmental student is enrolled during or after developmental work.*

My rationale for the use of games/simulations in developmental education can best be understood by having before you the assumptions on which the rationale is based. First, virtually all students are developmental students in some areas and virtually all students will be so while we continue to require a liberal arts, humanities, or even communications component that is not directly linked to the student's major field of study. For students who are not prepared for their own field of study the problem is no different.

*It is assumed that the developmental students have been identified.

To take not such an extreme example, a student taking British Literature as the third course in English because he has to have three courses and the third composition course is offered when he has to be in an electronics laboratory is, unless he is English, went to a private high school, and had at least a survey of British history, in all likelihood a developmental student in that class.

Second example, a student with an auditory problem in a class that required discussion is a developmental student. A country boy studying Urban Sociology may also be a developmental student. This backhanded definition is not necessarily broader than what some feel is developmental education, but it does prescribe a different approach to instruction and support. Clearly then, it is not sufficient to simply state that the student is deficient. Rather it is the nature of the deficiences, the gaps, and the content and processes necessary for the student to be ready to learn that for which he is enrolled or must be enrolled that requires enunciation. There is another issue that must be raised here even though it is often only reluctantly considered. Developmental students may not be capable of learning the content and processes the way we teach them and may not be able to transfer or generalize from the small bits we are able to teach them. There may be proto-processes and pre-content that have to be learned first (excuse the comparison, like math and reading readiness in kindergarden). Developmental education can be strengthened by using games/simu-

lations and researching what about them actually helps students learn not just in that class but also provides the skills and ideas that broaden repertoires of attack systems for developmental areas.

PURPOSES/GOALS

CONSTRAINTS	KNOWLEDGE/ SKILLS	AFFECTIVE/ INTERPERSONAL
EXTERNAL STRUCTURE	MASTERY SKILL GAMES	T GROUP SENSITIVITY HUMAN RELATIONS MANAGEMENT/ DECISION MAKING
INTERNAL STRUCTURE	COMPETITIVE SCORING	ROLE PLAYING

DESCRIPTION OF USE

Games/simulations can be described and categorized several different ways. A framework with two bisecting continua appear to be functional when dealing with their use in developmental education. One continuum deals with structure and external constraints. The other deals with the purpose or gains of the game/simulation. The chart accompanying illustrates the variables.

In designing, utilizing and evaluating a game or simulation, one must not expect it to do too much. It must though meet one's expectations with regards to roles, goals, resources, rules, interaction, and sequence of events. A mastery skill cannot be learned using a game in which one can make up the rules or goals as one goes along or worse yet, has no rules. A game which is expected to heighten sensitivity to an issue or another person cannot be expected to accomplish its purpose if the player plays in isolation with no feedback. This does not mean that a game/simulation cannot have multiple elements. Systemic games, for instance, are those generally which set very exacting parameters as to how one is to play and the outcome. The player simply plays well or poorly. One of the games on the market (Masterpiece) has roles one can adopt to play.

> Millicent Friendly--Spinster Librariam from Central City. Won a free trip to Omaha in 1947 where she was first exposed to great art. Later inherited modest sum from a secret admirer and parlayed it into several million through cautious, skilled investment in art. Seemingly shy and unassuming, but reputed to have a mean temper.[9]

At the other end, role playing exercises can be designed to deal with critical points in history and the students can be required to research out the facts, figures and processes. The students can even "win" at role playing by accurately portraying personalities. Students in a wide variety of games/simulations can be encouraged to self-animate. Cautions need to be taken though so that the learning experience is educationally sound and not problematic from a psycho-social dynamics perspective. Developmental students may be particularly sensitive.

The crux is not whether one can categorize games/simulations into a nice paradigm, but the appropriate use of games/simulations for developing the psychomotor mechanisms, proto-processes, and the preconcepts that are necessary for the student to have at least an even chance with more advanced learning.

The idea of preconcepts and proto-processes is essential not only in determining the value of games/simulations, but also in providing an aid in formulating objectives and activities in any type of developmental education. The area of psychomotor skills has been severely neglected except in cases of physical handicaps. By analogy, how does a pencil sharpener sharpen pencils is not the same as how does one sharpen a pencil. Let us list some concepts first.

Pencils are constructed of a graphite core (which wears and breaks at the wrong times) and wood (which can be cut). A blade or blades set at a certain angle will, if the pencil or the blades

are rotated properly (not both at once), cut into the wood and graphite resulting in a conical end to the pencil. Now, let's look at the process--going backwards, taking the pencil out of the sharpener at the right time, the cutting, rotating and insertion all involve a significant set of behaviors that can go awry if the psychomotor skills are not properly developed or if attention is diverted. Note that we haven't even spoken of the purpose or uses, proper or otherwise, of pencils or even why one would wish a sharpened one, let alone what happens to the shavings.

Games/simulations unlike most modes of instruction break down actions into component parts of a 'synergistic whole, allowing, nay, requiring the student to work with the parts as well as the whole.

Choosing, modifying or developing a game or simulation involves basically similar processes. In fact it is worthwhile to ignore the differences between games and simulations at the outset and allow to develop what will. One should be as careful in choosing a marketed game/simulation as one would be were he developing it on his own. Claims may have been made that for the user's purposes cannot be fulfilled. The opposite may also be true; upon proper examination (with a few modifications sometimes) many commercial games/simulations can be useful.*

The steps in choosing or designing a game/simulation are de-

*Copyright law is very hazy on games/simulations, but be careful.

ceptively simple. One might be tempted to combine, skip or rearrange a few steps, but don't! The process itself is so important that if bastardized, may end up with a seemingly good product that does the exact opposite of one's intentions.

First, decide what it is you want the student to learn. The use of behavioral objectives here is absolutely essential not just good for any administrator looking over your shoulder. What is asked for in a game and simulation is behavior. Break up the objectives into the smallest steps possible into the chronological, logical or causative order that the concepts or processes require.[10]

Second, determine what proto-processes and preconcepts the student must have in his repertoire to do the behaviors. Must he be able to add, know the parts of a battleship, be able to spin a spinner? If, as a result of this predetermination you have reason to believe that this student lacks these knowledges and skills, there must be a mechanism within the game/simulation for teaching these also.

Third, design the general structure of the game/simulation by specifying in relation to your behavioral objectives the following:

a. roles
b. goals
c. resources
d. interactions
e. sequence of events
f. external factors

At this point the product in process is worth sharing with one's colleagues and some students before going any further. Being so close to the game/simulation, one can be oblivious to problems. Trouble shooting here though does not obliterate the need to do so later.

Four, write out the game/simulation as a process, describe in excruciating detail what may, could, can, should and might happen. By doing this you will be able to determine what materials you will need and be able to develop the rules.

Five, design the materials, boards, tokens, information sheets, score sheets etc. In the initial stage, economy and visibility should be the major criteria of design. Later on, you may wish to design more durable pieces. Make sure you make extra pieces to use in case of damage or loss.

Six, write the rules.

The general learning objectives--knowledges and skills in terms of the behavioral objectives--concepts, processes, pre-concepts and proto-processes must be clearly articulated.

Specify: who (how many are involved)
what(actual action)
when(sequence of action)
where(materials, environment)
how (manipulations)
why (what is the outcome, how does it end)

It is worthwhile to describe a specific round, sequence or segment of the game/simulation for the rules.

Seven, evaluate the game/simulation and revise considering

the objectives, realism in terms of validity, comprehensiveness, verisimilitude and playability.

Eight, pre-test and evaluate again with revisions as necessary.

It is necessary to clearly articulate the behavioral objectives with what is to be learned. Games/simulations can be designed and used to teach knowledge of terms and concepts, specific facts, structures and relationships. Intellectual and social skills can be reinforced and enhanced. Manipulative skill development is the original reason for simulation development. Even attitude formation and change can be encouraged. BUT, the behavior that is required in these activities must be part of the activity of game/simulation. Simply giving students skills in buying property as members of other races with pseudo-limitations imposed on them does not reduce prejudice!

Advantages, Warnings, and Suggestions

There is only one way of finding out about games and simulations and that is to try them. A few additional notes though are in order, not only for the novice, but even for the professional who at times has been very frustrated when using games/simulations. Two anecdotes to illustrate:

While I was doing my master's work at the University of Missouri, I was asked to assist in teaching a course entitled "Human Relations in Educational Administration" to a special group of school superintendents. The regular instructor and I worked many hours putting together "relevant" lectures, case studies, and discussion outlines. The first two sessions were fabulous: the superintendents were attentive; we, the teachers, presented all the important theoretical material and were ready to get into the meat. In presenting the case materials for discussion, we felt something was wrong. The "students" just sat there as attentive as possible, but would not get involved. Even after our deciding to be antagonistic to each other's presentations, they just sat there. We went further and made some ridiculous statements we were sure would at least provoke comment--still nothing. We decided the problem revolved around something called peer pressure. Even among, or especially among, school superintendents, there was a very strong need not to disagree or say anything that might sound dumb.

We hit on the idea of wiring the underside of our seminar

table with a buzzer system. We indicated to the class that if they had a question, to buzz and we would go over and explain, or illustrate what we had said. Still nothing.

Accidentally I hit the buzzer and my colleague started giving more detail. I then continued to hit the buzzer and while it was noisy, we forced each other to do what the class didn't. During the break, the superintendents attempted to determine who among them was the culprit. It seems that not only were they trying to avoid conflict but they also reasoned as our own students often do that if there were no questions, they would get out earlier.

We then structured each session to simulate aspects of human relations problems in which teachers, students, and community were involved. My colleague and I served only as "legal advisors." It worked.

After a visit to Atlantic City, several ideas came to mind. One, the use of games of chance in teaching mathematics and even simpler arithmatic skills. Even Bingo and Bingo type games can be directly used or modified.

Two, many of the skill/chance games can be used for what I called proto-processes as well as for physics and mechanics. My first year in college was spent at Drexel Institute of Technology (now Drexel University) in hustling pool on all the freshman engineering students because their professors had told them to study the "properties" of the game. Because I already knew the "prop-

erties" I had more spending money than many of my fellow classmates did. In many respects they became better engineers. I was majoring in business administration.

Advantage: The importance of roles with external motivation similar to that encountered in a real life situation often makes the difference for the student who cannot see the relevance of learning (specific material or in general). The behavioral parameters are those of the game rather than seeming arbitrary ones superimposed by the instructor. Cause and effect are apparent and imminent.

Warning: The consequence of each possible combination of players' decisions must be considered and included. The resources each player has, the value to each person of their actions has to be clearly worked out.

Advantage: One of the strongest points favoring the use of games/simulations is that it gives the student experience with the things that are simulated, thus allowing the student to develop an opinion about the object in question more efficiently than simply discussing it or even viewing a movie about it in the classroom. One of the problems in career preparation has been in the academic reliance on non-participatory learning. A student can easily pass all the tests, that is, have all the knowledges necessary, and yet not be successful, because of his lack of experience in doing the operation. Possibly more important, in the

traditional classroom, the student never gets to know whether he would like what he is going to be doing and while liking what one does may not be crucial, one's attitude towards one's work can be important especially since it may mean he does it better if he likes it. The bitter experience of the U.S. Army with our 90 day wonders during WW II and in Korea and many public school teachers are cases in point, respectively.

It is not simply the simulation or reproduction of the static appearance of a task situation that gives games/simulations an advantage over other methods of instruction; it is the approximation of the tempo and patterning of the movements involved--that is the dynamic processes leading to the completion of the task.

Games/simulations increase students' ability to perform in the real situation and increase his actual contact with that real situation. By participating in a simulation, students are encouraged/required to ask the same questions one must ask in real life.

Advantage: Games/simulations remove aspects of competition that inhibit students from learning from each other and substitute a more functional competition. Weaker students are able to see the process and strategies of the more successful students. The learner is caused to look at himself and others in the classroom roles and the roles of the game differently than they would in other more traditional situations.

Suggestion: Multiple plays of the game/simulation or at least other presentations that reinforce the concepts or processes are

better than the game played in isolation. Behavioral Objectives here again help direct the learning process. Do not assume that the concepts are understood simply because students have successfully completed the game.

Advantage: The teacher is no longer judge and jury; he acts as an interpreter and observer. He resolves ambiguities and solves problems. He is in a position to actually observe the process of learning rather than simply test for the product. He is in a position to help students generalize, extrapolate, and transfer their learning. In many respects, he is individualizing his course.

Warning: Playing games and conducting simulations is not easy; nor does it give the instructor more time to do other things. The game/simulation has to be carefully monitored; students have a way of doing the unexpected and rather than worrying about having the students unlearn something, it is simpler to keep a watchful eye on the proceedings.*

Advantage: A major aspect of developmental education is helping students learn to learn independently. Problem solving, inquiry, discovery and trial and error methods have been used with varying success often contingent on students' capabilities in verbalization and concept abstraction. Games/simulations can sometimes get around this problem also. Games/simulations used in the military, management, and think-tank operations has shown that even when concepts are so abstract that terminology is underdeveloped, participants

*The use of a trained para-professional though can free up some of a professional's time to work on other projects, including more games/simulations.

can even develop the language and the understandings simultaneously.

Advantage: One of the problems professionals have in working with developmental students is their seeming stubborn reluctance to ask questions or say when they don't understand material, process, or implications. Games/simulations properly designed, utilized, and supervised get around this problem and in the best Skinnerian tradition provide small steps in the learning process.

Advantage: A compounding problem for developmental students is the fear of failure. Many of them have experienced it too often and in traditional learning modes, failure is often likely to reoccur, not because of any inherent difficulty in the material (though that may be an issue too), but because the student has not, cannot or refuses to learn that way. Games have an end and after all is said and done (and often is), there is more likelihood of risk taking and equanimity regardless of the game/simulation's outcome. The reward system is manifest and for students who are externally motivated, this too can be important.

Warning: The best simulation may not be the most realistically complete, but the one which integrates the most significant features of the skill in an effective temporal and spatial pattern.

Warning: Success in the game should depend on learning the thing the game is supposed to teach. If a game requires that a student throw dice and move tokens, than that is what he will learn, no matter what is on the game board--it is the process that counts.

Warning: In spite of what we were told in our methodology classes it is important not to confuse activity, enthusiasm, or noise with learning. Students often spend so much energy enjoying the game, they miss the objectives of the simulation or game. While games/simulations can be fun, the instructor must construct and supervise the learning experience to maximize its educational purpose. Once again, the need to develop and clearly articulate process oriented behavioral objectives is felt.

Suggestion: Many games regardless of their designer's initial intention can be used to increase basic communication skills; verbal, written, mathematical and social. Many games which are designed using computers can be used to teach computer logic, binomial distribution, structural aspects of language, etc.

Many of the games/simulations designed for general audiences can be used in an instructional mode with or without variations. Also, many of the games designed for younger age students can be upgraded, made more sophisticated or adapted in language, process, and goals. Even playing them as is with the proper preparation of the students can be worthwhile. While a few students talk as though simple material in traditional form is babyish and appear resistant, proper preparation by the developmental staff person of games/simulations can go a long way toward alleviating negative attitudes of this sort.* There may still be a few who resist getting involved in games/simulations; observer or critic status as

*Use of modified Dolch Cards came immediately to mind.

an intermediate step often can draw this type of student into the center of activity.

Suggestion: Please note that games/simulations do not have to be completed for students to gain something (but they have to be "completable"). In fact, the first time around with a game/simulation might very well be a "dry run" with a traditional lesson, audio-visual presentation of other type of learning experience sandwiched in and the actual playing of the game later on. To decrease frustration, especially if one knows the students will experience difficulties with the game, a simulation of the simulation is advantageous. With the developmental student, the potential of (winning) the game may add motivation to doing the other work preparatory to the actual playing of the game if he/she is tempted by seeing the game.

Warning: A simulation cannot be considered successfully completed by someone who would not be able to do the real thing because of psychomotor limitations. A child who has a toy car and can negotiate it on the pavement cannot drive a two ton gas guzzler on the Interstate. What he is doing is playing not simulating. He may develop attitudes toward the real thing, but should wait until he is ready before taking his father's car.

Most board games from Concentration to Monopoly can be modified for Sociology, Psychology, Political Science and Economics.

Many of the board games currently commercially available are over generalizations of the reality as it exists. For this reason

they are ideal heuristic exercises in the Social Sciences if the instructor or para-professional is willing and able to work with the students on that point directly.

Warning: Virtually all students say they understand most of what we teach. After all, what we teach is simply an abstraction of reality and unless they are constantly high, experience it and are convinced they understand it. Thus our responsibility is tremendous. In many cases we have to help our students "unlearn" incorrect or inadequate generalizations.

Again the idea of proto-processes is applicable. By showing students that their overgeneralizations are less than universally valid by simulating them, its easier to help them develop alternative thinking processes.

A side note on discussions. After games/simulations teachers often engage in elaborate and extensive discussions with students in an effort to determine whether they "really understood" the game/simulation. While some discussion is worthwhile, especially if it is structured as a problem solving session that evaluates students ability to extrapolate, generalize or transfer learning from the game, a complete "debriefing" may serve only as a reinforcement for the instructor for being so clever in using games/simulations in the classroom. Just as the game/simulation must have clearly articulated objectives, so too the discussion should. Students may, if debriefed extensively, simply forget the game and its value; the discussion may serve for them as the test and they, therefore, don't have to worry about it any more.

If the objectives are clearly stated, the process evaluation of students' achievement will eliminate the need for extensive discussion. Tangential interests that have nothing to do with the objectives, such as students' personalities and their enjoyment of the game/simulation, are questionable except in certain psychology, business and other specific situations if and only if that objective was clearly anticipated.

Don't expect a game/simulation to do too much especially on an ad hoc basis. Students should be encouraged though to point out difficulties in playing the game or doing the simulation, both from the point of view of the rules and from its simulating of reality.

Again, while certain students are resistant to game/simulation situations for a wide variety of reasons, one must be cautioned not to throw out the game because of a few unfavorable comments. Certain adjustments may be considered and attempted. Even a bad game can be played for its instructional value (how long have we taught Sherwood Anderson?) as long as the students are cognizant of the reason for playing the game. Students often suggest variations that not only would make the game more exciting, but also more realistic. Again be careful not to add too much to make it too complicated, even if the complications are realistic.

EVALUATION

The issue of evaluation appears simple on the surface. "Does it work" should be the question and the answer should be simple enough to deduce, "has the student learned those concepts or processes the game/simulation was supposed to teach?" But the question is over -simplified and the answer is incomplete. The behavioral objectives should guide the evaluation.

1. Does the game or simulation really get at the concepts it is meant to teach?

2. Are the processes in which the student is involved those that will help him learn?

3. Does the student perceive the feedback in the game or simulation and does he correct his behavior when needed and repeat his behavior when it is correct?

4. Is the application, generalizability, or transfer from the game or simulation clear to the student?

5. Is application made?

In the final analysis, one's use of games/simulation is determined by five factors:

1. Do the students and professionals feel comfortable with it?

2. Is it functional--does it do the job efficiently and effectively?

3. Is it flexible? modifiable?

4. Is it practical in time, effort, and money invested?

5. Does it present realistic and worthwhile information?

First, games/simulations are not panaceas; they must be part of an integrated teaching/learning unit and even that isn't enough. That unit must be tied in with others that prepare and reinforce the learnings that the game/simulation is supposed to assist the student in learning. It may be difficult if not impossible to determine whether the game/simulation was responsible or not for any learning that did or did not take place.

Second, games/simulations are expensive in terms of time, money, effort, and supervision. Thus the question should have added to it, "Is the game/simulation an efficient and effective way of helping the student learn?" Situational factors will dictate the answer to that part of the question.

Third, because a student did not demonstrate the knowledges or skills that the game/simulation was supposed to teach does not mean that the game/simulation failed. There is a slash between the teaching and learning in teaching/learning. Enough said.

Summary and Afterthoughts

There is probably not an area of instruction that cannot be supplemented with games and simulations. Note, I say supplemented and not supplanted. Games and simulations must be used carefully. While there are some course-of-instruction long activities, they require a certain class synergy, a certain type of instructor and a certain educational environment. While this particular combination is sometimes present, often times it is not.

It is important to note also that while learning through games and simulations can be and may be fun, some students have difficulty making the transfer of learning, even when it is directed for them.

Games and simulations are just that; they are not the real situation--they approximate it, just as a laboratory situation or apprenticeship approximates the real work situation.

Students and instructors should not get so involved in game situations that they forget the objectives of the course and the particular learning situation. There must be a point to playing the game or simulation and that point must be made clear to the student.

How to use what you have. First, there are so many games and simulations on the market that one must choose carefully. Some cannot be played by large classes, even if divided up into teams. Other games can be played even though they are designed for as few as two people if the instructor modifies the instructions

or rules to require conferences with teammates. Oftentimes, observers can be appointed who analyze the players, the playing and possible alternative strategies. One can also appoint critics (who are naturally present) and their job is to describe why the game is an abstraction of reality and the concepts covered in the game.

Read the instructions so that you can explain them. Make extra copies. If the instructions are complicated or take long to read, schedule accordingly. Sometimes, as with films, it is best to prepare and/or debrief students; sometimes for the sake of impact, it is worthwhile to let them play and let them think until the next class. Pay attention to their comments while they play.

You may even want to put in twisters. For instance, in a game called Cities one can turn some of the lights out and tell the class there is a city wide power failure and they have to deal with that as an external factor.

In board games, the use of a low table is advised, rather than the lecturer's desk which makes for non-equal distances to reach by players. Students often have to be encouraged to participate rather than observe. Participation by the shy ones can be increased by removing the "natural leaders," otherwise known as loud mouths, from the center of the action--give them other roles.

Unless you are trying to develop certain skills among mathematically slow students, don't appoint them treasurers. Also be

careful of racial, age and sex mixes of teams--at least be aware of them.

The best way to learn the value of games and simulations is to go at it.

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